

AN
INQUIRY,

PHYSIOLOGICAL AND PATHOLOGICAL,

INTO THE

PROXIMATE CAUSE OF CHOLERA.

BY

PROTHEROE SMITH,

MEMBER OF THE ROYAL COLLEGE OF SURGEONS,

SENIOR SURGEON TO THE FARRINGTON DISPENSARY.

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TO

WILLIAM SMITH, M.D.

THE FOLLOWING OBSERVATIONS

ARE DEDICATED,

AS A MARK OF AFFECTIONATE ESTEEM,

BY HIS SON,

PROTHEROE SMITH.



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WHILE such an impenetrable cloud of mystery seems to envelope the subject of Cholera, almost precluding our arrival at any just conclusion as to the most efficient mode of treatment, I think it is a duty incumbent on every practitioner to give publicity to such facts as may in any way elucidate the nature of its proximate cause. It is with this feeling I now venture to offer to the public the observations contained in the following pages, written chiefly during the reign of the epidemic in 1852; and, should they in any manner serve to throw a light on the physiology or pathology of this fearful malady, my reasons for making them public will be fully accomplished.

That medical men are divided in opinion, as to the most effectual remedy, in the present day, is very evident, from the numerous accounts under which

the press groans, of cases treated with medicines as various as they are opposite in their operations; yet what course of treatment has hitherto been proposed, which has such a direct sanative influence, as to enable us to say, with any degree of certainty, that the recovery of the patient has been solely attributable to it? This fact, though sincerely to be deplored, is by no means a subject of surprise, when we reflect on the empiricism of the many *modus curandi*, which consist chiefly in combating the disease by applying remedies to *symptoms*, whilst the *origin* is left, if not unheeded, certainly without much constant and serious investigation. It is only by diligently inspecting the morbid changes of the different organs of those who have died from this malady, that we can come to any sound conclusions as to the nature of its real essence. This was a conviction which prompted me to avail myself of an opportunity for extensively observing the morbid appearances of this disease in the autumn of 1832. Through the introduction of Mr. KIERNAN, I became acquainted with M. HALMA GRAND, who was deputed by the faculty of Paris to investigate the nature of Cholera, on its arrival in London, previous to its appearance in the former city. I assisted this gentleman in his post mortem examinations, and collected accounts of a large number of cases. The deductions which I drew from a consideration of them I will here concisely state, and leave to those enlightened members of the profession, who are unbiassed by any prejudiced views, to investigate for themselves the validity of my positions, before they condemn, as theoretical, the

opinions which I shall offer on the immediate or proximate cause of the *Cholera Epidemica*.

The organization, of which man is constituted, is susceptible of innumerable motions, some dependent on the will or volition, others resulting from causes altogether latent, and over which we have but little controul. The former are illustrated by the power of muscular action peculiar to animals; while the latter, including the vital functions, — circulation, respiration, and digestion, are also possessed by vegetables: the first of these divisions constitutes the animal, the other the vegetable, life of man; and although there appears, on first inquiry, so little analogy to each other in principle of action, still the motive power of each would seem to be regulated by a peculiar stimulus applied to the nerves. I shall not attempt to speculate on the subtle medium or “animal ether,” “nervous influence,” “nervous energy,” or “innervation,” variously adopted by different writers, by means of which the soul or will acts upon and is influenced by matter, but I shall be content to admit, with Dr. ALISON, that the power of muscular contractility and of secretion is determined by the fundamental function of circulation and vital properties of the blood, and the truly vital affinities subsisting amongst the component parts of the animal frame. The experiments of HALLER, WILSON PHILIP, MAYO, BICHAT, BRESCHET, EDWARDS, LEURER, and LASSAIGNE, tend to support individual facts rather than to elucidate the causes of secretion and nutrition. “These phenomena,” says Dr. ALISON, “are inexplicable by, and inconsistent

with, any principles that can be deduced from the observation of dead matter, or of other functions of the living body ; at the same time it is obvious that they do not take place fortuitously or at random, but according to fixed laws ; we refer them therefore to a vital property, known to us only by its effects, and our notion of which is as yet necessarily vague and imperfect ; — which modifies chemical affinities in the living body, varying in different parts of the body, and causing these to be differently affected by, and produce different effects on, the blood that pervades them ; influencing likewise, no doubt, the chemical nature and relations of the blood itself. To this property the best name that has been given is *VITAL AFFINITY* : its existence will always be an ultimate fact in physiology, but the limits of its agency, and the laws according to which it modifies the chemical relations of the substances subjected to it, may be ascertained, and their development will probably constitute the next great discovery in this science."

To explain my views more succinctly, we will suppose the nervous system a distinct set of vessels, whose centre of motion is the brain and spinal marrow ; and these we shall also consider as not only the swift messengers of volition, and the instruments of sensation, but also the secret sources which, in a measure, regulate the involuntary operations of our vital organs. But the efficacy of this power seems dependent also on the agency of another function, that of circulation, the normal condition of which, as well as the natural consistence of the blood, are indispensable to the perfect

operation of the nervous system. Arrest the heart's action for awhile, and faintness, or loss of voluntary power, with oftentimes muscular spasm, are the results, which are removed by the restoration of cerebral circulation. In fevers, and other diseases where the vital nature of the circulating fluid is affected, deranged functions and nervous imbecility are the consequences. It is from the harmony of the several parts of the mechanical system which constitutes the body, that life and health result; but, when the balance is subverted, the consequence is disease or death. When an unnatural stimulus is applied to the surface of the body, the power of sensation, with which the nerves are endowed, conveys the impression to the sensorium, where the idea is formed of its nature; this perception of pain, received by the mind, is immediately followed by an excitement of the nervous system, in proportion to the severity of the stimulus; and an effort to resist the offending matter, is instantly set up, as is evidenced by external inflammations, induced by wounds or other injuries to the superficies of the body; to accomplish this, the heart contracts more forcibly, and at shorter intervals, the circulation is accelerated, and pain and heat result from the collision of parts. When the cause of this preternatural emotion is trifling and easily removed, the disagreeable symptoms soon vanish, and the mind and body are again restored to their primitive state of health and ease; but when the reverse obtains, and the unnatural stimulus is great, and not so easily removed, the sensation of injury is, as it were, repeatedly regurgitated upon the mind, inducing

more violent efforts to remove the cause of offence. This involuntary and unusual exertion of the sensorium being passed, a loss of power is induced — a state of collapse, proportionate to the extent and violence of the previous excitement; its different degrees constituting languor and lassitude, interruption to the involuntary functions of the body, syncope, derangement of intellect, and, finally, death.

Mental disquietude, or atmospheric influence, often exists as an exciting cause of diseased action, producing effects on the sensorium similar to those caused by external bodily injuries, and often inducing more suddenly the results above enumerated, as is instanced by imbecility or death occasioned by fright or grief, and by epidemic disorders arising from miasmata and other like sources. Thus, even when the exciting cause of disease is not cognizable to our senses, it often produces sequelæ more violent than the results of extensive corporeal injury; for instance, after exposure to pestilential miasms, the citadel of sensation and involuntary motion is so assailed, that the immaterial principle or nervous stimulus, on which all the animal functions depend, is excited into increased and violent activity, inducing the various symptoms of fever, &c., consisting at first of an excitement or increase of action in natural functions, — circulation, respiration, secretions, &c., and the depression of nervous influence, consecutive on an unnatural exertion of that power. This collapse, after great energy of the nervous power, must be a matter of daily observation, since it is produced not only by morbid

excitement of organs endowed with involuntary functions, but also by the common exertions in violent or continued muscular action; thus, as an instance of the latter, we know that the labourer, after his daily work, requires a certain degree of repose, to restore the lost equilibrium; and, with regard to the former, we may note the nervous imbecility resulting from organic disease.

Presuming on the justice of the foregoing physiological observations, I shall proceed to the inquiry of those conditions under which occur the various phenomena constituting the disease under consideration. Of the ultimate cause, or first principle, from which Cholera results, I shall not attempt to offer any other solution than that it depends and is consequent on the will of the GREAT AUTHOR OF NATURE; beyond this knowledge, the veil of human and finite intelligence precludes our view, and baffles our most subtle attempts to penetrate the mystery, and assign to this malady a remote or first cause. From fish, fruit, and atmospheric influence, each set forth as the exciting cause of Cholera, we find Dr. TYTLER turning his attention to *rice*, and stigmatizing the general food of a large portion of the human race as the seed from which sprung successive generations of afflictions, producing a harvest of spectres, which, during the last three years, have visited almost every part of the globe with their fatal and devastating presence. On the other hand, the late Professor DELPECH was persuaded that the disease is attributable to an affection of the *semilunar ganglia*. These inquiries, though supported with ability, need no refuta-

tion of the various hypotheses to which they have given birth. I shall therefore leave the subject to those ingenious speculators in mysteries whose time is their least valuable commodity, and shall proceed to treat of the proximate or immediate cause from which the evidences or symptoms of the Epidemic Cholera directly proceed.

All authors, who have attentively watched the progress of the disease, assign to it three distinct stages, in each of which the type or nature of the malady assumes a widely different aspect, requiring opposite modes of treatment, so that what is admissible in one might prove prejudicial or fatal in another; and it is from this circumstance that all empirical modes of practice have failed in general application. This division of the disease into stages is very important, and demands an attentive investigation. We find then, first, an inflammatory or feverish state, or one of excitement; secondly, collapse; and thirdly, consecutive fever, typhus, or debility. To each of these stages I shall devote a separate inquiry, at the same time endeavouring to explain, from an application of the above general principles, the physiology of each, deducing finally the mode which appears to me the most efficacious in combating the disease. In support of my opinion, I shall further bring forward the evidence of several cases, and post mortem inspections.

The preliminary symptoms which sometimes usher in this disease, as diarrhœa, nausea, vomiting, heat at the præcordia, &c. evidently indicate a disturbance of the *primæ viæ*; and the peculiar action of the exciting

cause is clearly that of morbid impression on the follicular apparatus of the intestines. Conscious of the attack, an effort is made at the centre of sensation and nervous influence to resist the assailant, and an abnormal and inordinate increase of action is established in the functions of the alimentary canal; the heart's action is greatly increased to supply the necessary means for the unusual and extensive alvine discharges. This then constitutes the first stage of excitement, or preliminary fever, in which bold blood-letting is the only effectual remedy; but, unfortunately, these symptoms precede the complete seizure by so short an interval, that the application of second means is sometimes altogether precluded, and some medical gentlemen have even doubted their existence. The rapidity with which this stage passes into that of collapse, admits of explanation, from the facts that an increased exertion is continued in the sensorium, by the excited state of the circulation inducing violent and unusual efforts, and producing the phenomena above enumerated. This would be alone a sufficient cause to induce a consequent collapse, or loss of power, from the inertia following unusual exertion of any function, but this sequela is effectually accelerated also by a rapid loss of the very power on which nervous energy depends, and by which vitality itself is sustained. The normal condition of the blood is subverted, and its free circulation interrupted, for the immense and rapid defluxion from the mucous surface of the intestines quickly robs it of its saline and serous particles, and renders it thick, tenacious, and unsuited to circulation. Hence the

second stage, or that of collapse, is easily explained. The influence of the nervous system, prostrated by unnatural and violent exertion, and also by a loss of that stimulus on which the elimination of its energy depends, is altogether incapable of controlling the new and destructive functions of the alimentary tube. The continuance of this abnormal action of the mucous follicles producing a more dense and tenacious condition of the circulating medium, it would necessarily require an increase of power in the heart to propel its contents through the usual channels, supposing they were of sufficient calibre to admit this thickened fluid. Under these circumstances, the result is, want of pulsation in the extremities, cold superficies, deficient pulmonary circulation, and, consequently, imperfect decarbonization of the blood; whence we observe the black colour of that fluid, as evidenced by the dark blue state of the body, from a stagnation in the venous system of this highly carbonized blood. When one secretion is excessive, the action of the other excretories of the body is generally very much lessened, or altogether suspended: and this law explains the suppression of the renal functions, and consequent contraction of the urinary bladder. The voluntary muscular contractility of the body, which is regulated by nervous power, now altogether uninfluenced by the rein which nature had placed as its guide, becomes, at first, violently and involuntarily active and irregular, inducing the spasmodic contraction of almost all the muscles, which accounts for the peculiar characteristic of this stage of the disease.

Thus we have moreover an explanation of the peculiar appearances assumed by the subjects of Cholera: the recti muscles, acting violently, retract the eye-ball into the socket, giving the hollow sunken aspect of that organ; while the power of the flexor muscles of the fingers, being superior to that of the extensors, overcomes the balance maintained in health, and the fingers become contracted in the manner usually seen in these cases. The continuance of these morbid actions, frequently carries off the patient in this stage of the disorder, which terminates often by a cessation of muscular spasm, consequent on a state of paralysis, from vascular engorgement, or effusion into the cavities or substance of the brain; this arises not only from the peculiar activity of the vessels of the head, but also from the fact, that the vicinity of the heart is gorged with blood too dense for distant circulation; thus the brain is overcharged, and serous, or sanguinous effusion, or apoplexy, present the final scene of the tragedy.

When the powers of the constitution are capable of resisting the disease, and the patient recovers from this state, the third stage — consecutive fever, or debility, results, and usually presents all the concomitants of *typhus*, a disease too well known to need description. In this stage of the disease there is a cessation of those morbid actions which constitute the preceding symptoms of the complaint; the secretions are again disposed to return to their natural functions; bile is again flowing into the intestines; and the spasmodic contractions of the muscles cease with the abnormal

secretion from the alimentary canal, and the heart pulsates with recovered freedom. What then, may be asked, is the pathology of this stage? and I would reply, that it results from the inability of the brain to regain its state of healthy equilibrium, after the unnatural and great excitement to which it has been subjected, and from which its delicate structure has suffered, so that there is an exhaustion of its power; added to which, we must cite the morbid qualities of the blood, inducing a consequent depreciation in the power of its "vital principle."

Thus we have successive states; the one resulting from the other, and producing a concatenation of symptoms, which have their origin in derangement of the *primæ viæ*. In support of the views of pathology, which I have just inculcated, I will cite a few post mortem examinations, which, I think, will substantiate the validity of my opinions, inasmuch as they all evince great cerebral disturbance, and in some instances, lesion of the substance of the brain.

CASE I.

This was the first case that appeared within the walls of the city of London in 1832. The subject of it was a woman, aged 43, the wife of a labourer; she was perfectly well two days previous to her death. The seizure commenced with great prostration of strength, subsequent to a painful attack of diarrhœa, violent spasms of the stomach and extremities; sickness and purging supervened; her dejections presenting that fluid, of a rice-water consistence, so peculiar to the disease.

Amongst other remedies which were employed, such as brandy, and opium, calomel, &c. a mustard emetic was administered; but all the symptoms having increased, with a livid appearance of the extremities, she sunk in the space of about fourteen hours from the time she was first seized.

Autopsy.

External appearances. Shrivelled face; eyes sunken, and surrounded with a dark areola; hands and fingers contracted; the feet extended, and the muscles of the calf in a state of rigid contraction; the extremities had a blue appearance.

Head. The pia mater was very much congested with blood, and an effusion of an almost transparent fluid was observed underneath the arachnoid. The brain, on being cut, presented a pink appearance of its medullary substance, being covered by innumerable spots of blood, indicative of turgescence of vessels, similar to that of the meninges.

Thorax. The heart, on opening the pericardium, seemed of a larger size, as if it had been injected; the coronary arteries and veins were full of purple-coloured blood, the cavities were, in a like manner, filled with the fibrin, separated in the usual form; the large vessels of the lungs, (which proved to be emphysematous) contained dark-coloured blood, and the vessels leading to and from the heart were in like manner distended.

Abdomen. The portal system contained its usual quantity of blood, but the gastro-epiploic veins were congested. The mucous membrane of the stomach was much inflamed, and thrown into corrugation,

from the contraction of its muscular coat, and these folds of the villous lining were connected by a number of bands of fibrin, which plainly shewed the extent of the inflammatory action. These appearances were observed about the middle of the great arch, extending towards the pylorus, and there was some of the mustard still adhering to it; the stomach contained a small quantity of the rice-water fluid; the whole of the small intestines were filled with a fluid resembling thin gruel; the large intestines were equally distended with a similar secretion, but having a tinge of red; the descending colon, sigmoid flexure, and rectum were contracted and empty; the intestinal canal, throughout, was devoid of fœculent odour; the gall bladder and ducts were full of thick viscid bile, of a dark green colour, none of which was found in the intestines; the pelves of the kidneys contained about half a tea-spoonful of a secretion resembling that of the bowels, and about a tea-spoonful of it was remarked in the bladder, which was contracted to the size of a turkey fig, and, as well as the kidneys, was entirely free from urinary smell. In this case the first stage of the disease was almost wanting, so rapid was it in its progress. The mustard emetic evidently produced harm, as witnessed by the consequent inflammation. There was a very peculiar odour perceptible during the examination of this case, which I have never remarked in opening bodies defunct from other diseases. The subject of this disease was a patient of Mr. LANGSTAFF, and lived in Red Cross Street. The examination at the time was reported before the London Medical Society, and in the London

Medical and Surgical Journal. She died on the 5th of March, and was opened four hours after death.

CASE II.

William Wentworth, æt. 47, a fine stout well made man, who had never suffered from illness, was seized on 10th March, 1852, with sickness and vomiting, and copious rice-colored fluid evacuations. This was attended by violent pain of the bowels, and cramp of the lower extremities. On the following day the cramps left him, but the diarrhoea continued until the 12th, when he was considered to be much better; a relapse however ensued on the 13th, attended with general coldness and blueness of the skin. Stimulants and opium had been used with apparent success, but the blue stage having come on, carried off the patient just at the commencement of the third stage of the disorder.

Autopsy.

The body was examined the day after death. On opening it I was sensible of the peculiar odour before mentioned. There was great engorgement of the heart, lungs, and intestines, which last exhibited a dark colour; some feculent matter and bile were found in the bowels, with an admixture of the rice-coloured fluid; the bladder contained about half a tea-cup full of dark-coloured urine; the brain shewed evident signs of inflammation, and the vessels of its membranes were filled with a dark grumous blood; there was also serous effusion into the ventricles. The body externally presented the following appearances: blueness

of the extremities; fingers contracted, and on being straightened making a crackling noise; eyes sunken, and surrounded by a dark areola.

CASE III.

W. B., ætat. 67, was attacked with diarrhœa and sickness, accompanied with great pain at the scrobiculus cordis, which was most relieved by vomiting; the fluid ejected resembled gruel, in which floated some small dark substances like tea leaves; a similar fluid was voided from the bowels, though of rather a darker colour, and entirely devoid of fœculent odour. On the following day at noon, he was much easier, and expressed a hope that he should recover; but towards night spasms of the extremities supervened; his countenance fell, and seemed shrunken; his eyes were hollow, and surrounded by a dark areola; his arms and legs, contracted by the violent action of the muscles, were quite cold, and of a lived hue, as was also his face. No radial pulse could be felt, and he was constantly moaning or screeching in a kind of falsetto voice; he died early on the following morning.

AUTOPSY, 5 hours after death.

Head. On removing the calvarium, the dura mater seemed to be one closely woven mesh of blood vessels, filled with dark blood; the smaller ones however had more of a scarlet appearance. The tunica arachnoidea was opaque in several spots, and between it and the pia mater there existed a serous effusion, which presented also the same gorged state of vessels; the medullary substance, sliced, exhibited a pink appearance, with

innumerable specks, from which oozed drops of dark-coloured blood; there was sanguineous effusion into the lateral ventricles, and the choroid plexus and lining membrane were highly vascular.

Thorax. A gorged state of its viscera; the cavities of the heart contained blood, which had but a very small portion of coagulated fibrin.

Abdomen. Vena cava did not appear fuller than natural, although its blood was thick and uncoagulated; the stomach had a portion of rice-coloured fluid in it; the bowels, excepting from the transverse colon to the rectum, which was empty and contracted, contained a similar fluid; toward the valvula coli, the ilium presented an ulcerated state of its follicular apparatus; the kidneys were devoid of urinary secretion, but contained a few drops of fluid similar to that of the intestines; the bladder, shrunk to the size of a turkey fig, had no urine or urinary smell; the whole muscular system was in a state of rigid contraction, and on opening this body the same peculiar odour mentioned in former cases was perceptible. This patient lived at Limehouse, and had always been healthy until this attack, although from his poverty his diet had been of the poorest description.

CASE IV.

A labouring man, aged 71, who had always been remarkable for good health, was attacked with great prostration of strength, and shivering, attended with nausea and griping; these symptoms increased, and the whole body presented a leaden hue; there was no pulse

at the wrist; the heart's contractions did not exceed twenty in a minute; tongue and breath cold; surface of the body cold and clammy; great oppression of breathing; spasmodic cramp over the whole body; insatiable thirst; constant request for cold water; liquid stools, resembling rice water, without fecor, and passed involuntarily; no secretion of urine; severe vomiting. Stimulants, externally and internally, were administered; hot-air baths and other means were also employed without success; the man gradually sunk, and died after eight hours suffering. The body was opened four hours after death.

AUTOPSY.

There was a blue appearance of all the external parts of the body, with a contracted state of all the muscles; on removing the skull-cap the meninges appeared gorged with dark-coloured blood, and the brain, which shewed evident signs of high vascular action, was in several places apoplectic; there was also an effusion, tinged with blood, in the ventricles; the heart, lungs, and thoracic viscera, generally, were gorged with blood; the stomach was somewhat corrugated, and contained a small quantity of rice-coloured fluid, in which floated some dark substance resembling tea leaves; the bowels were rather vascular, and contained a similar fluid; the transverse and descending colon were contracted and empty; the bladder was shrivelled to a very small size, and its cavity appeared almost obliterated; neither did this viscera or the kidneys present any urinary smell; the blood in the cava was

thick and uncoagulated, and of a tarry nature; the factor, peculiar to Cholera bodies, was particularly evident in this case, and the fingers crackled on being straightened, which last circumstance was thought by M. HALMAGRAND a peculiar characteristic of Cholera.

I might recount several other cases, but think the foregoing sufficient to show the frequency of cerebral derangement in this disease. It would be well perhaps to observe that in a case I examined, which died in the last or *typhoid* stage of the disorder, there existed, in conjunction with other appearances, extensive ramollissement of the brain.

From a consideration of the pathology and morbid appearances of Cholera, I shall proceed to consider the most eligible method of treating it; and assuming the justice of the foregoing remarks, and the truth of the premises from which I deduce my ideas of the proximate cause of Cholera, the indications of treatment will be,

In the first stage, to reduce nervous and vascular excitement and fever:

In the second stage, to arrest the morbid intestinal secretion, and to restore the lost power of the sensorium and blood:

In the third stage, to support exhausted nature until the normal vigour is restored, and to prevent putrescency; the consequence of loss of vital principle in the blood and brain.

In this place it may not be amiss to make a brief review of the success which each author has obtained; I shall therefore subjoin a concise sketch of the various

remedies, which have obtained projectors and supporters in the treatment of this disease.

Mr. JAMES KENNEDY, in the first stage, recommends a warm bath, blood-letting, and large doses of calomel and opium to be instantly prescribed; in the second stage, dry heat, and stimulants, such as æther, ammonia, and brandy. In the rapid type, blood-letting to the extent of from twenty to thirty ounces in an adult,—if drawn before the blood has deserted the superficial vessels,—and dry heat and internal stimulants. In the second stage he considers blood-letting to be injurious.

Dr. KIVER, Commissioner of the District of Bochnia, affirms that the following plan is one adopted by the Jews of Wilsnig, and that out of two hundred and forty cases only two died, and they refused to adopt the remedy. The patient is to be kept under warm coverlids, and his hands and feet to be rubbed powerfully with the following liniment: take a pint of strong spirits of wine, half a pint of white wine vinegar, add to them one ounce of powdered camphor, one ounce of flower of mustard, a quarter of an ounce of pepper, a tea-spoonful of bruised garlic, and half an ounce of powdered *cantharides*; mix, and expose it in a bottle for twelve hours in the sun, or in a warm place, frequently shaking it; during the operation of friction with this embrocation, the patient must take a glass of strong drink, composed of two parts of chamomile flowers, and one of balm mint: this plan is to be persevered in till perspiration ensues, whilst dry heat is to be applied to the stomach and bowels.

Dr. JENKINS, of St. Petersburg, advises a remedy consisting of five drops of the following compound for a dose: of landanum two drachms and a half, oil of peppermint half a drachm, and a table-spoonful of a mixture every two hours, consisting of six ounces of decoction of marsh mallows and half a drachm of diluted sulphuric acid; with dry heat externally. He says, "camphor, calomel, emetics, and baths, I have found ineffectual, and the oil of mint far more beneficial than the cajeput oil."

Mr. H. BELL observes, in the first stage early bleeding will frequently produce almost instantaneous recovery. In India it was generally practised, and out of eighty-eight cases thus treated, Dr. BURRILL reports that only two died. At Basorah and Bagdad it was adopted by Drs. MEUNIER and MORANDO with good effect, and in Russia, according to Sir WILLIAM CRIGHTON, and at Warsaw, previous to the battle of Astrolenka, as M. BRIERRE DE BOISMONT informs us, with great success; as also in Dunaburg in European Russia, by Dr. EWERTZ. In the subsequent stage Mr. BELL advises dry heat and frictions, with small doses of opium, aether, camphor, ammonia, pepper, drogue amere, spirits, and calomel; he strongly objects to large doses of opium, and the application of epispastics, but permits cold drinks, acidulated with tartaric acid; in the after treatment, or "Fever Stage" of Drs. BARRY and RUSSELL, he prescribes ten grains of calomel, followed by a cathartic powder or pill.

M. FOY has advocated laurel water, and Dr. MAHLE of Poland prussic acid, applying their remedies only

to *symptoms*; upon which principle opium, musk, camphor, and æther were employed, as antispasmodics, in India, Russia, Poland, &c.

M. BRIERRE DE BOISMONT proposes sprinkling two grains of acetate of morphia on a blistered surface. On the same principle of combating symptoms, brandy, aminonia, musk, capsicum, bark, essential oils of mint, cloves, cajeput, &c. have been administered. The antiphlogistic plan was practised by those of the school of BROUSSAIS, who considered some slight ulcerations of the glands of Peyer and Brunner the leading morbid change.

M. DOUBLE speaks of large doses of calomel: ANNESLEY gave calomel in scruple doses, repeated from three to five times, with a view to remove the creamy secretion of the intestines, which alone seemed affected by the remedy; this method was followed by Drs. JAMIESON and CORBYN, and was enforced by the Marquis of HASTINGS in the order of the day issued to the English army.

In Batavia, according to M. REVEILLÉ PARISSET, venesection and calomel proved highly destructive, but great success was obtained by a mixture of two parts of essence of peppermint and one of laudanum.

Mr. SEARLE speaks very confidently of the success of common culinary salt, administered, both as an emetic and purgative, in warm water, and MM. ISENBECK and BRAILLOW followed the same practice in St. Petersburg; in the majority, however, of

successful cases cited by these gentlemen venesection had been employed.

Dr. BILLING, in a letter in the *Lancet*, Feb. 4, 1832, observes, "the remedies proved to be most successful are venesection, tincture of opium, opium, brandy and other spirits, essential oils, neutral salts, and emetics of ipecacuanha and mustard, and with external warmth;" he strongly advocates the use of the lancet.

Dr. REID CLANNY'S *modus curandi* consists in emetic and venesection in the first stage, with opiate *enemata*, followed by blue pill, ten or twenty grains, every four or five hours.

The physicians of the Isle of France employed Glauber salts, and in some vessels of the United States powder of burnt cork had been used. In Persia, in 1821 and 1822, cold water and acid verjuice had their advocates. After the battle of Warsaw Dr. LEE found the subnitrate of bismuth useful, in doses of three grains every hour. Cajeput oil, phosphorus, ox gall, castor oil, turpentine, and magnesia, have all had their seasons of celebrity, and subsequent neglect.

Mr. J. H. SREIN, of Manchester, has written on the inhalation of oxygen gas. Dr. TAYLOR, of Kingston, speaks of opening the radial artery, when venesection is impracticable. Dr. O'SHAUGHNESSY has advocated the injection of highly oxygenized salts into the venous system. Mustard emetics, first administered by Dr. GIBSON of Sunderland, and put into operation by Dr. LINDSEY, met with a strong advocate in Dr. JAMES JOHNSON, who also advised copious

injections per anum. At Sunderland, tight ligatures were applied round the limbs to relieve the cramp. Tobacco injections* have been tried by Dr. BAIRD, of Newcastle; and the galvanic battery, in a case at Haddington, with success. Dr. NEGRI states he has found cinchona of great service; Dr. PAUL SLADE KNIGHT has advocated the alkaline salts; and H. W. DOON, of Houghton-le-spring, venesection.

From an attentive review of the various modes of treating Cholera, it may be remarked that the plan most in accordance with my views, has, in general, proved of most avail. Mr. KENNEDY, in his valuable work on Cholera, asserts, that his plan of remedying this malady has proved more successful than any he had seen practised, and the evidence of the mass of authors on this subject has a similar tendency. It would be going beyond the limits of a pamphlet to discuss the superiority of Mr. KENNEDY's plan in comparison with that of other writers, I must therefore leave it to those who feel interested in this new disease sufficiently to investigate the merits of the different modes of treatment; and I feel confident their researches will induce the conclusions I have myself drawn.

To accomplish the indications of cure in the *first stage* of this disease, where the excitement or fever is well marked, and the medical man is called in time, bold *venesection* seems decidedly the most rational, and from all accounts the most speedily successful, of all curative means which have been tried; it reduces cerebral excitement, and consequently lessens

the source from whence the diseased action is derived. This treatment, followed by a large dose of calomel and opium, usually restores the patient to safety, the opiate arresting the inordinate condition of intestinal secretion; whilst the mercury effects an attenuated condition of the circulating medium, and at the same time excites the normal action of the alimentary follicular apparatus, the liver, and other important secreting organs, essential to the perfect functions of the chylopoietic viscera; hot-air baths will also be found serviceable.

The *second* indication requires decisive and bold remedies, or the patient very quickly sinks, and in this stage, when the external aspect of the sufferer seems to threaten speedy dissolution, and the vomiting, purging, and cramps are severe and unremitting, I have often found a dose, consisting of from ten to twenty grains of calomel, with three grains of powdered opium, and the same quantity of powdered capsicum, act like a charm, and at once relieve the distressing symptoms of the disease. I usually, to an adult, repeat the administration of half this dose every quarter or half hour, until the sickness and cramps subside, and this I have usually found to obtain, after two, or at the farthest three, doses of the medicine. In severe cases, during collapse, I also have recourse to mustard cataplasms over the chest and abdomen, as well as to the legs and feet; I raise the temperature of the room by means of a fire, and covering the patient with blankets, occasionally administer hot brandy and water; by adopting this plan I have often been gratified by seeing my

patient, in the space of a few hours, restored to comparative ease and comfort, from a state bordering on the grave. Re-action takes place; the vomiting ceases; the cramps subside, or entirely vanish; from a pulseless state of the extremities, and from the ghastly death-like line of the blue stage, the sufferer is relieved, and the grasp of death in which he was struggling is relaxed; a general perspiration bursts out over the body; pulsation and freedom of circulation return, and the patient expresses himself relieved, and confident of recovery: in this state the mercurial plan should be persevered in until the system is affected, nor should the use of stimulants be altogether withheld.

As a general beverage, at this stage, I have obtained most benefit from soda water, with a small quantity of brandy in it; this I give freely to my patients, particularly where great thirst exists, as is generally the case, and it is not only a good diluent, and grateful to the patient, but also yields a quantity of free carbonic acid gas, which tends to tranquillize and soothe the irritability of the stomach; when no relapse takes place before salivation is established a favourable prognosis may generally be relied on, but when the calomel and opium are neglected, after re-action is once produced, a second collapse will often carry off the unwary subject of this fearful malady; indeed from this second collapse very few have ever recovered.

The indications in the *third* stage of the disease are accomplished by the administration of the remedies usually employed in typhus, and consequent debility,

and which are too well known to the profession to need description in these pages.

To illustrate the plan of treatment I have been advocating, I will cite, from a large collection of notes, two cases,—the first that of Mr. Batton, the severity of whose symptoms, and the speedy efficacy of the remedies employed, satisfactorily evince their claims to public notice, the second, extracted from *The Lancet* of May 12 1832, is a history of my own case.

CASE I.

Mr. Nathaniel Button, ætat. 35, of Holborn Bridge, a hale stout healthy man, of an active disposition, occasionally subject to diarrhœa, but otherwise enjoying a good state of health, experienced some griping pains in the stomach, accompanied by frequent motions of the bowels, on Monday, August 25, 1834. This he attributed to some “flat ale” which he had taken on the preceding Sunday.

26th, Tuesday. The above described symptoms were not relieved, and he had recourse to some brandy and water, two or three times in the course of the day, but did not alter his usual diet. He took a powder at bed-time, containing Dover’s powder, with hydrarg. cum creta.

27th, Wednesday. The diarrhœa increased, his dejections presenting the rice-water appearance, attended by some nausea, and occasional vomiting; he did not however relax from his duties as a confectioner. Having obtained a draught composed of tinct. catechu, creta, and tinct. opii, he was somewhat relieved, and even attended the Mechanic’s Institution in the

evening. He abstained this day from drinking malt liquor.

28th, Thursday. Although he experienced a slight alleviation of symptoms, still the diarrhœa continued, and he applied to me for relief. Having often been subject to a looseness of the bowels, which as often gave way to the compound ipecacuanha powder with hydrarg. c. cretâ, I furnished him with a few doses of this medicine; such remedies however failed to relieve, and I was called up at night by my patient. At this time his pulse was good and natural; tongue rather white; urine scanty, in fact he had passed but little during the week. He did not experience much debility. I gave him a grain of opium and powdered capsicum in a cretaceous mixture every four hours.

29th, Friday. Early this morning, finding himself unrelieved, he called in Dr. CLUTTERBUCK, who prescribed aromatic confection, with compound tincture of cardamoms and 20 drops of laudanum, every three hours. About half past 10, A.M., I was sent for in haste; I found him very much altered in face, inasmuch that at first I scarcely recognized him; his features were shrunk, his eyes hollow and glassy, and great anxiety was depicted in his countenance; the superficies of his body presented a dark leaden hue; he experienced severe cramps in his stomach and legs, and vomited a watery fluid. These symptoms were attended by frequent dejections of the "rice-water" secretion; his pulse was scarcely perceptible at the wrist; the head, face, and extremities were cold, and suffused with a cold perspiration, and he altogether appeared

in articulo mortis. At the suggestion of a medical gentleman who was present, he took a dose consisting of half a drachm of the wine of colchicum, three grains of calomel, and a quarter of a grain of opium, with compound spirits of ammonia in camphor julep; this however was not retained a moment. A consultation was then held between Dr. CLUTTERBUCK, Mr. MORLEY, and myself, when, as the case offered so few apparent chances of success, nothing of moment was suggested by either of those gentlemen, who seemed to entertain but very faint hopes of the patient's recovery. It was at this juncture that I ventured to propose the adoption of a plan of treatment which I had seen employed on board the "Dover," with more success than any other; and, with the approbation of the above-named gentlemen, I immediately applied a large mustard cataplasm over the region of the stomach and bowels, as well as to the soles of the feet, and at the same time administered half a scruple of calomel, three grains of opium, and the same quantity of powdered capsicum; this medicine was retained, and was the first thing not immediately ejected. I anxiously watched the symptoms, and was delighted to find them evidently alleviated by the remedies I had employed. Some re-action soon became apparent; the pulse was more perceptible at the wrist; and some warmth had returned to the extremities. In half an hour half the quantity of the above dose was administered, and again at the expiration of another half hour. At this time the cramps were almost entirely relieved, excepting in the legs, and he had not vomited since the exhibition of the

first dose; still there were occasionally cramps in the inferior extremities. I now gave two doses, containing two grains of calomel and capsicum with one grain of opium, at intervals of an hour, and afterwards repeated it every two hours through the night, with occasional draughts of sal volatile, brandy and water, and soda water. By these means, with blankets, and keeping the room warm, excessive perspirations were obtained during the night.

30th, Saturday. All the symptoms had greatly improved; the sickness having entirely disappeared; the purging was much abated, and become bilious; he had made a little water; had some pain in the head, but complained chiefly of the effects of the mustard poultices; pulse 160, rather full. Saline medicines were now resorted to, occasionally administering a slight opiate; his breath indicated the mercurial fœtor, and his gums became very sore; a low type of fever continued for a few days; which soon disappearing, a gentle tonic medicine quickly restored the patient to his usual good state of health. Between the afternoon of the 29th and the evening of the 30th my patient had taken fifty-five grains of calomel, besides which, during his illness he had swallowed thirty grains and a half of solid opium and forty-four and a half of powdered capsicum.

In this case the prompt relief afforded by the use of calomel and opium, administered in decisive doses, in the second stage of the disorder, was very evident and satisfactory.

CASE II.

In my own case, which I extract from *The Lancet*, No. 454, I state, that having "about three months before my attack wounded my hand in dissecting, so much irritative fever ensued as greatly impaired my general health; in this weakened state of the constitution, when the Cholera made its appearance in this city, I became much engaged with Mr. KIERNAN and M. HALMAGRAND in prosecuting their investigations into its nature and assisting them in many post mortem inspections, as well as several times witnessing the various precursory symptoms of the disorder. On Thursday the 12th of April I attended, as Mr. KIERNAN's assistant, to inspect a case of malignant cholera, which had proved fatal, in New Street, Cloth Fair, and on the morning of the following Saturday I was present at an examination, in the same house, of a woman who had struggled with the disease for several days, and had died in the last or typhoid state of the complaint. During the afternoon, I felt a degree of lassitude, and had two loose and griping evacuations with a painful sensation, as if my stomach and intestines were spasmodically affected, although I had carefully abstained from all indigestible food; about twelve, p. m., I was seized with violent spasms of the stomach and bowels, and also of the legs and arms, accompanied by great sickness, the fluid ejected resembling oatmeal gruel, with an admixture of some dark substances having the appearance of tea leaves. Mr. BURRIDGE, the

gentleman who first saw me, immediately sent for Dr. WALLER and Mr. KIERNAN. My face and tongue were then quite cold, and likewise my upper and lower extremities, which were violently convulsed, resembling the spasmodic twitchings of an animal subjected to galvanic influence. These occurred several times in the course of a minute, and were accompanied occasionally by a much more painful contraction of the muscles, in which the toes seemed forcibly pulled in contrary directions; my eyes were sunken and surrounded with dark areolæ, and the pulse, which was exceedingly small, was about 100. Dr. WALLER, who arrived first, instantly applied bottles of hot water to my feet, and warm flannels to the abdomen, at the same time enveloping me in blankets, and raising the temperature of the room as much as possible by a large fire; two grains of opium in two ounces of white brandy, with a little hot water, were then administered, and I was requested to resist the inclination to vomit. During the spasms Dr. WALLER used friction with his hand. This treatment was persevered in for some time, with evident signs of re-action. At the expiration of a few hours a profuse perspiration broke out, and the spasms gradually lessened in severity. The diaphoresis was continued through the night, and during the whole of the following Sunday. I dozed at intervals, with a low muttering delirium; my thirst was excessive. Dr. WALLER, Mr. KIERNAN, and Mr. BURRIDGE remained with me all night, and administered occasionally hot brandy and water. At noon on Sunday the spasms had almost entirely subsided, and the sickness and inclina-

tion to go to stool were much abated; towards evening, however, there was an increased excitement of the arterial system, and a slight return of the cramps, with much restlessness, which were in a great measure subdued by administration of two grains of opium, with some hot brandy and water; the night was passed in dozing, interrupted by incoherent talking, and I was conscious of a painful sense of weight in the sensorium. On Monday the 16th I was pronounced out of danger, when all the unpleasant symptoms had disappeared. The secretion of urine was entirely suspended until the Sunday night. My bowels were relieved three times on Monday: the first motion was scybalous; the second seemed to be that fluid peculiar to the disease; and the third consisted entirely of very viscid and acrid bile. From this time I have gradually improved, although the disease has left great debility and weakness, with irritability of the stomach and intestines, obliging me repeatedly to have recourse to opium. In this case fear could not in any degree have operated as a predisposing cause, as I had not felt any. It is necessary, perhaps, to observe, that at the time I contracted the disease my health was in a much more improved state than when I first visited persons labouring under this malady, and attended post mortem examinations of their bodies. But this was the only body which I had opened where death had occurred in the *typhoid* stage of the complaint."

In the foregoing cases, with the general observations which accompany them, I have recorded some of the results of my experience in the pathology and treatment of this formidable disease. And here, before drawing to a conclusion, let me observe, that in placing this *brochure* before the public I have been guided by, I hope, no unworthy motive. My chief object was to add to the large general stock of professional information such particulars as appeared to me to have escaped the attention of those who have treated on the subject of Cholera. Experience, the strictest test of theory, lays open its evidence alike to the greatest and to the least of observers; and although indeed the acute philosopher usually detects with precision the slightest indication, it not unfrequently falls to the lot of the more humble inquirer to elicit circumstances which, among the multitude of facts, had eluded the observation of the former. The huge coral reef is the work of minute but countless polypes; so the construction of a correct theory arises from the congregation of facts elicited by the diligence of a host of fellow-labourers. It is with these feelings that I issue the present pages; content to aid, at least, as a zealous pioneer in the path of Medical Science.

The mite of information herein contributed to the already accumulated fund may probably be thrown aside among the heap of emanations from the pens of others; if, however, the Author's observations should attract the notice of a few of his professional brethren,

he will be rewarded, not only by the consciousness of having performed what he deemed to be a pleasing duty, but by the confident hope that his remarks may have the effect of inducing some votaries of other plans of treatment to adopt the system herein sincerely advocated.

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